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10/585,910	07/12/2006	Sture Helmersson	1026-0007WOUS	1390

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EXAMINER
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PALABRICA, RICARDO J

ART UNIT	PAPER NUMBER
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3663

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/585,910	<b>Applicant(s)</b> HELMERSSON ET AL.	
	<b>Examiner</b> Rick Palabrica	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 25,27-30 and 33-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25,27-30 and 33-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Applicant's 1/19/10 Amendment, which directly amended claims 25, 35, 36, 38, 39, and 45-48, and traversed the rejection of claims in the 9/17/09 Office action, is acknowledged.

Applicant's arguments with respect to the rejected claims have been considered but are moot in view of the new ground(s) of rejection. However, secondary reference, Feutrel, is still applied in the rejections herein.

### ***Response to Arguments***

2. Applicant traversed Feutrel on the ground that his "cylindrical sleeve 14 formed by the tongues 16 is not intended for forming a cell for receiving a fuel rod, but a guide tube for a control rod." Underlining provided. It appears that applicant is asserting that Feutrel is non-analogous art.

The examiner disagrees.

First, the teaching derived from Feutrel is not the use of a sleeve for receiving an element such as a guide tube. Instead, the teaching is on the manner of construction of the sleeve, i.e., overlapping ends (see section 4 of the 9/17/09 Office action).

Second, in response to applicant's argument that is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed

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invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both the applicant and Feutrel are concerned with a sleeve and its construction.

Therefore, Feutrel is pertinent to applicant's sleeve formation.

In any event, an additional secondary reference, i.e., Raven et al. (U.S. 4,172,761) is cited below for a teaching on the overlapping ends of a sleeve.

### ***Drawings***

3. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 25, 33 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Katsumizu (U.S. 4,740,351) in view of either one of Luther (U.S. 2,558,523) or Sliney (U.S. 3,419,363); or b) Nylund et al. (U.S. 5,363,422) in view of either one of Krawiec (U.S. 3,664,924) or Johansson (U.S. 5,178,825); or c) Johansson et al. (U.S. 5,519,747) in view of either one of Feutrel (U.S. 4,594,216) or Raven et al. (U.S. 4,172,761) and further in view of either one of Krawiec (U.S. 3,664,924) or Johansson (U.S. 5,178,825).

Katsumizu with either one of Luther or Sliney

As to claims 25 and 48, Katsumizu teaches a spacer (see, e.g., Figs. 1, 9, 26, and 28) enclosing a plurality of sleeves 222, each forming a cell and arranged to receive a single rod 4, the sleeve made of a sheet-shaped material formed into a substantially cylindrical shape and whose ends are overlapping (see Fig. 26).

The sleeves are designed to protect the fuel rod surface from damage or scratching during insertion of the fuel rod into the spacer. Katsumizu notes:

*"The protective sleeve may be left unremoved after insertion. In such a case, the protective sleeve protects the fuel rod also against the fretting which may otherwise be caused during the transportation. It is advisable to leave the protective tube on at least one of the fuel rods adjacent the all of the frame of the spacer assembly, because the damaging of the fuel rod is most liable to occur on the portions of these fuel rods contacted by the dimples on the frame wall." Underlining provided. See col. 3, lines 27+.*

As to the sleeve material, Katsumizu states:

*"In the described embodiment, the sleeve 21 of the jig 20 is made of a polyester film. The use of polyester, however, is not exclusive and the sleeve can be made of other suitable materials having large tensile strength and small tensile rupture elongation, as well as high self-lubricating power." Underlining provided. See col. 6, lines 7+.*

Either one of Luther or Sliney teaches that a nickel-based alloy is self-lubricating (see col. 2, lines 35+ in Luther or claim 2 in Sliney).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Katsumizu, by the teaching of either Luther or Sliney, to substitute a nickel-based alloy for polyester as the sleeve material, to gain the advantages thereof (i.e., better strength), because such modification is no more than the use of a well known expedient in the nuclear art, and the substitution of one sleeve material by another well known material.

As to the connection of the sleeve ends by welding, this is a product-by-process limitation. MPEP 2113 states:

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777F.2d 695, 698, 227 USPQ 964, 966.

Additionally, the spacer thickness is matter of optimization that includes a proper balancing of competing factors, e.g., a thicker spacer provides stronger structural support for the fuel rods but results in higher parasitic neutron capture than a thinner spacer. As to matters of optimization within prior art conditions or through routine experimentation (see MPEP 2144.05 II.A).

MPEP 2144.05.II (Optimization) requires that a particular parameter be recognized as a result-effective variable, i.e., a variable which achieves a recognized result. The thickness of the spacer is clearly a result effective variable, which achieves varying degrees of benefits, as it is varied. Different thicknesses result in different parasitic neutron captures and different structural strengths, but largely predictable.

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Nylund et al. with either one of Krawiec or Johansson

As to claims 25 and 48, Nylund et al. teach a spacer (see, e.g., Figs. 1-10) enclosing a plurality of sleeves 1, each forming a cell and arranged to receive a single rod 5, the sleeve made of a sheet-shaped material formed into a substantially cylindrical shape.

They teach an embodiment wherein the ends of the sleeve overlap, as evidenced by the following statement in their specification:

*"According to a suitable embodiment, the first and second planes of a spacer are joined together by sleeves by joining together the first and second side plates. The lower ends of the sleeves in the first plane may then be positioned at a small distance (about 2-3 mm) from or on a level with the upper ends of the sleeves in the second plane. Alternatively, the sleeves may be joined together such that a certain small overlap arises between the ends of the sleeves."*

This overlap occurs in the following embodiment where the sleeves in the first plane are aligned with the sleeves in the second plane, as described below:

*"In the embodiments shown every other sleeve 1 in a so-called rod lane is located in a first plane and every other sleeve 1 in a second plane. This distribution of the sleeves 1 is, of course, not necessary. The main thing is that the sleeves 1 are distributed relatively evenly over the cross section of the bundle with substantially half the number of sleeves in one plane and the remaining sleeves 1 in the other plane. The sleeves should also be distributed such that one sleeve 1 in one plane, viewed axially, covers a gap 13 in the other plane." Underlining provided. See col. 3, lines 46+.*

In said configuration where the sleeves in the first and second planes are aligned, applicant's claim language reads Nylund et al. as follows: a) "sleeve" reads on the combination of a sleeve in the first plane and a corresponding sleeve in the second plane; b) "first end" reads to the lower end of the sleeve in the first plane; c) "second end" reads on the upper end of the corresponding sleeve in the second plane.

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Nylund et al. do not specify the material for the sleeve. However, either one of Krawiec or Johansson teaches that it is old and advantageous to use a nickel alloy material, e.g., Inconel, for the spacer sleeve. Krawiec teaches that Inconel's resiliency is not adversely affected by prolonged radiation exposure (see col. 1, lines 51+). Johansson teaches that Inconel material for ferrules is attractive because it is lighter than Zircaloy (see col. 4, lines 9+).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Nylund et al., by the teaching of either Krawiec or Johansson, to use a nickel-based alloy for the sleeve, to gain the advantages thereof (i.e., good physical and nuclear properties), because such modification is no more than the use of a well known expedient in the nuclear art.

As to the connection of sleeve ends by welding, this is a product-by-process limitation.

As to the spacer thickness, this is a matter of optimization.

Johansson et al. with Feutrel or Raven et al. and further with either Krawiec or Johansson

As to claims 25 and 48, Johansson et al. teach a spacer (see, e.g., Figs. 1-3) enclosing a plurality of sleeves 1, each forming a cell and arranged to receive a single fuel rod, the sleeve made of a sheet-shaped material formed into a substantially



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cylindrical shape. The sleeve includes encircling arms 16, 18 (see Fig. 1 and col. 3, lines 58+).

Note from Fig. 1 of Johansson et al. that the two ends of arms 16, 18 require attachment. They teach welds are made at “arms 16 and 18 of the unit cells” (see col. 5 lines 1+). Said welding then closes the ends of the arms 16, 18.

Either one of Feutrel or Raven et al. teach(es) a sleeve whose ends overlap (see Fig. 3 in Feutrel or Fig. 3 in Raven et al.) These secondary references provide teaching that is relevant to applicant's claimed sleeve (see section 2 above).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the sleeves in the apparatus, as disclosed by Johansson, by the teaching in either one of Feutrel or Raven et al., by forming a sleeve from a sheet-shaped material, overlapping a first end to a second end, and joining them by means of at least one weld point, to gain the advantages thereof (e.g., greater flexibility on the configuration of the cell, stronger union of the sleeve ends), because such modification is no more than the use of a well known expedient within the nuclear art.

Alternatively, the claims would have been obvious because a person of ordinary skill has good reason to pursue the known options of forming the sleeve within his or her technical grasp, particularly in the light of the teachings in Feutrel or Raven et al. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

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Johansson et al. do not specify the material for the sleeve. However, either one of Krawiec or Johansson teaches that it is old and advantageous to use a nickel alloy material, e.g., Inconel, for the spacer sleeve. Krawiec teaches that Inconel's resiliency is not adversely affected by prolonged radiation exposure (see col. 1, lines 51+).

Johansson teaches that Inconel material for ferrules is attractive because it is lighter than Zircaloy (see col. 4, lines 9+).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by Johansson et al., by the teaching of either Krawiec or Johansson, to use a nickel-based alloy for the sleeve, to gain the advantages thereof (i.e., good physical and nuclear properties), because such modification is no more than the use of a well known expedient in the nuclear art.

As to the spacer thickness, this is a matter of optimization.

All of the above applied art

As to claim 33, see above discussion of spacer thickness in claims 25 and 48.

Also, the claims are replete with statements that are either essentially method limitations or statements of intended or desired use. For example, "for holding a number of elongated fuel rods intended to be located in a nuclear plant", etc. These clauses, as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference, as long as the structure of the cited references is capable of performing the intended use. See MPEP 2111-2115.

See also MPEP 2114 that states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647.

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531.

[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525,1528.

As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

The system in the cited references is capable of being used in the same manner and for the intended or desired use as the claimed invention. Note that it is sufficient to show that said capability exists, which is the case for the cited references.

5. Claims 27, 34-39, and 40-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. in view of either one of Feutrel or Raven et al. and further in view of either one of Krawiec or Johansson.

As to claim 27, the weld joint in the applied art is either inherently includes a spot weld or obvious to have included a spot weld.

As to claim 34, the sleeve of Johansson et al. has an upper edge and lower edge (see Fig. 1).

As to claims 35 and 36, applicant's claim language, "ridges", reads on the spring legs 12, 14 with bulbous portions 24, 26, which legs extend from the upper edge to the lower edge of Johansson et al.'s spacer (see Fig. 1).

As to claim 37, the number of ridges is a matter of design and/or optimization.

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For example, more ridges result in better support for the rods but higher parasitic neutron captures (see also above discussion on spacer thickness).

As to claims 38 and 39, see Fig. 1 in Johansson et al.

As to claims 40, 41 and 42, see Fig. 3 in Johansson et al. showing the sleeves abutting each other at lattice points. As to connection by weld joints, see col. 5, lines 1+.

As to claim 43 and 44, and four orthogonal sides, see Fig. 1 in Johansson et al.

As to claims 46 and 47, see Fig. 1 in Johansson et al.

6. Claims 28-30 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Johansson et al., as applied to claims 25, 27, 34-38, 40-44, and 48 above, and further in view of either one of Matzner (U.S. 5,416,812) or Taleyarkhan (U.S. 4,698,204).

The modified Johansson et al. disclose the applicant's claim limitations except for the vane.

As to claim 28, either one of Matzner or Taleyarkhan teaches that it is old and advantageous to have a mixing vane in a boiling water reactor to increase the critical power limit (see Figs. 4-7 and col. 3, lines 50+ in Matzner or Figs. 6-9 and col. 2, lines 30+ in Taleyarkhan).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus, as disclosed by the modified Johansson et al. , to include a vane to gain the advantages thereof (i.e., improve heat

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transfer characteristics of the system), because such modification is no more than the use of conventional designs/techniques within the nuclear art.

As to claims 29 and 30, see Fig. 5 in Matzner or Fig. 7 in Taleyarkhan.

As to claim 45, it would have been obvious to an artisan to have the vane in the above applied art can be made to extend from one of the orthogonal long sides because these sides provide greater flexibility in the placement of the vane.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rick Palabrica/  
Primary Examiner, Art Unit 3663

February 22, 2010